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# CATALOG FOR PRESSURE CONTROL EQUIPMENT

## Supplement 3

### API CONNECTOR ACCESSORIES

#### Ring Gaskets, Flange Bolts and Nuts, Hammer Wrenches

This catalog supplement provides information to allow selection and accurate ordering of the most common flange accessory items. WOODCO USA offers this equipment to customers so that everything needed to make leak tight connections, everytime, can come from one reliable source.

TRADEMARK



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**WOODCO USA presents this catalog to gain your attention and secure your business**

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## 1.0 General

WOODCO USA offers supplements to general catalogs in order to provide more detailed information about specific equipment.

### 1.1 Purpose

WOODCO USA intends this supplement to communicate the availability of standard, high quality, connector accessories for API flanges and equipment.

### 1.2 Connector Accessories Include

Ring Gaskets  
Bolts and Nuts  
Tap End Studs  
Wrenches (Hammer Type)

### 1.3 Application

Connector accessories described in this catalog meet API and other national and/or international standards, for attaching flanges and other end connectors, to achieve a leak free and secure joint.

### 1.4 Specification

WOODCO USA supplied accessories first comply with API specifications when applicable. When no API specification applies, WOODCO USA complies with ASME or ASTM requirements. When national or international standards do not include such items of equipment, WOODCO USA shall confirm that such equipment meets manufacturers' and buyer's written specifications.

## 1.5 Reference Standards

API Spec 6A  
API Spec 16A  
API Spec 17D  
ASTM A 320 GR-L7 Bolting  
ASTM A 193 GR\_2H Nuts  
AWHEM TR 9501

### 1.6 Material

Ring Gaskets meet the requirements of API Spec. 6A and ASTM B16.5.

Unless otherwise specified, soft iron and low carbon steel ring gaskets shall have zinc plating.

Bolts and Tap End Studs meet the requirements of ASTM A320 GR-L7. (WOODCO USA shall always substitute GR-L7 bolts for GR-B7).

Nuts meet the requirements of ASTM A193 GR-2H.

Wrenches shall meet manufacturers' written specifications.

## 1.7 Service Temperature

All API specified Ring Gaskets meet all PSL levels and the full range of temperature for all API ring joint connections, -75° F to 350° F.

All Bolts and Tap End Studs listed meet ASTM A320 GR-L7 specification, Charpy impact tested at -150° F. Acceptable for all PSL levels and -75° F to 350° F service temperature.

Wrenches included in this catalog do not have any extreme temperature rating and should only see use at temperatures human operators can reasonably survive without special protective gear.

## 1.8 Quality

WOODCO USA defines "Product Quality" as conformance to specified requirements. We select suppliers on the basis of their ability to provide materials, products and/or services which conform to WOODCO USA and API or industry specifications.

All API specified Ring Gaskets meet all API PSL levels 1, 2, 3 and 4.

WOODCO USA makes a final visual and hand inspection of items listed in this catalog immediately prior to shipment, to insure against handling damage and/or shelf wear.

## 1.9 How to Use This Catalog for Reference and Order Placement

For API Spec 6A flanges reference Table 1 starting on Page 6 of this catalog. This table will identify Ring Gaskets, Bolts, Tap End Studs, and Wrench sizes for each currently available flange.

Order Ring Gaskets by quantity, type, number designation, and material.

Order Bolts and Nuts by quantity, size (OD) and length; and surface flange, subsea flange or clamp application.

All Bolts and Nuts for API specified flanges have inch designations for diameter, length, and thread pitch. The following chart shows thread pitch for each diameter bolt specified by API.

Diameter	Threads Per Inch (TPI)	Thread Form
5/8"	11	60° Unified National
3/4"	10	60° Unified National
7/8"	9	60° Unified National
1" and larger	8	60° Unified National

Bolts and Nuts orderd from WOODCO USA will conform with API requirements for diameter and thread.

For API Spec 16A Clamp Bolts, Nuts, Washers, and Safety Hoist Rings, reference the WOODCO USA Catalog for Clamps for Clamp Hub Connections.

Order Hammer Wrenches by nominal diameter of bolt or nut size (Wrench for "H" size Bolt) or wrench for "N" size of nut), see section 4.0 of this catalog supplement.

Discuss any special requirements with a WOODCO USA technical representative.

## 2.0 Connector Accessories

### 2.1 General Information

Flanges with "R" ring grooves can connect and seal with either R or RX ring gaskets. RX ring gaskets increase the stand-off between flanges, and studs shown on this chart have sufficient length to accommodate RX gaskets in these connections. In some cases equipment design may restrict clearance and shorter studs will increase convenience. For information on these shorter stud lengths, see **AWHEM document TR9501 at [www.awhem.org/docs.htm](http://www.awhem.org/docs.htm)**. To compare the difference in stand-off see **Flange Make-up, Stand-off and Drift**.

**Caution:** The difference in stand-off between R and RX ring gaskets can cause alignment problems on close coupled manifolding or pressure controlling loops. Assembly designers specify component dimensions which allow for the difference in stand-off between flanges when choosing either R or RX ring gaskets. When operators perform maintenance that involves disassembly, trouble free reassembly requires using ring gaskets the same as the ring gaskets originally chosen.

Ring gaskets marked SRX or SBX have identical measurements to RX and BX ring gaskets with the the same number designation, and they will fit the same corresponding connectors. API Spec 17D intends SBX ring gaskets to seal all 17D SS and SV flanges and all 6BX flanges used for subsea applications.

Note: API Spec 17D intends SRX ring gaskets to seal only 5000 psi segmented flanges. The "S" indicates such designated ring gaskets have vent holes to allow reliable connector make-up underwater (subsea). Any stainless steel RX or BX ring gasket may have modification to "S" designation by installation of the necessary vent hole. API Spec 17D requires that manufacturers use only corrosion resistant alloy as the material for these gaskets.

Obsolete, Discontinued or Withdrawn flanges not included in the chart below, also use B7/L7 connecting bolts. For more information about these flanges, see individual flange pages in the **Flange Slide Rule Program** on the [www.woodcousa.com](http://www.woodcousa.com) web site.

For more information about ring gaskets, see **Ring Gasket Handling and Inspection Before Assembly** section of Web Site Tools on [www.woodcousa.com](http://www.woodcousa.com).

For more information about ring gasket sealing, see **Field Appraisal of Ring Grooves** section of Web Site Tools on [www.woodcousa.com](http://www.woodcousa.com).

For more information about flange connection make-up, see **Flange Make-up, Stand-off and Drift** section of Web Site Tools on [www.woodcousa.com](http://www.woodcousa.com).

## 2.1 General Information

Ring Gasket numbers as specified by API Specs 6A and 17D. Bolts, Tap End Studs and Nuts comply with API Spec 6A and 17D with dimensions determined by AWHEM Specification for Stud Bolts and Tap End Studs, TR9501.

**Table 1, Reference for Ring Gasket, Bolt, Tap End Stud and Wrench by Flange Size**

(ALL DIMENSIONS SHOWN IN INCHES)

Flange Size	Ring Gasket	Ring Gasket Weight Each (Lbs.)	No. of Bolts	Through Bolt	Bolt Weight Each (Lbs.)	Tap End Stud	Tap End Stud Weight Each (Lbs.)	Hex Nut Size Across Flats (wrench size)	Nut Weight Each (Lbs.)
1-13/16" 10M	BX-151	0.337	8	3/4" x 5-1/2"	0.566	3/4 x 3-3/4"	0.412	1-1/4"	0.193
1-13/16" 10M 6BX TO 17SV	BX-151 SBX-151	0.337	8	3/4" x 6-1/2"	0.669	3/4 x 4-3/4"	0.515	1-1/4"	0.193
1-13/16" 15M	BX-151	0.337	8	7/8" x 6"	0.850	7/8" x 4-1/8"	0.602	1-7/16"	0.297
1-13/16" 20M	BX-151	0.337	8	1" x 7-3/4"	1.431	1" x 5-1/8"	0.969	1-5/8"	0.425
2-1/16" 2M	R-23	0.755	8	5/8" x 5"	0.350	5/8" x 3-5/8"	0.263	1-1/16"	0.119
	RX-23	1.15							
2-1/16" 3M	R-24	0.87	8	7/8" x 6-1/2"	0.921	7/8" x 4-5/8"	0.673	1-7/16"	0.297
	RX-24	1.33							
2-1/16" 5M	R-24	0.87	8	7/8" x 6-1/2"	0.921	7/8" x 4-5/8"	0.673	1-7/16"	0.297
	RX-24	1.33							
2-1/16" 5M 17 SS TO SS	BX-152 SBX-152	0.425	8	7/8" x 6"	0.850	7/8" x 4-1/4"	0.638	1-7/16"	0.297
2-1/16" 5M 17 SS TO SV	BX-152 SBX-152	0.425	8	7/8" x 7"	0.992	7/8" x 5"	0.744	1-7/16"	0.297
2-1/16" 10M	BX-152	0.425	8	3/4" x 5-1/2"	0.566	3/4" x 3-7/8"	0.412	1-1/4"	0.193
2-1/16" 10M 6BX TO 17SV	BX-152 SBX-152	0.425	8	3/4" x 6-1/2"	0.669	3/4" x 4-3/4"	0.515	1-1/4"	0.193
2-1/16" 15M	BX-152	0.425	8	7/8" x 6-1/2"	0.921	7/8" x 4-3/8"	0.638	1-7/16"	0.297
2-1/16" 20M	BX-152	0.425	8	1-1/8" x 8-1/2"	2.037	1-1/8" x 5-3/4"	1.438	1-13/16"	0.592
2-9/16" 2M	R-26	0.93	8	3/4" x 5-1/2"	0.566	3/4" x 4"	0.437	1-1/4"	0.193
	RX-26	1.42							
2-9/16" 3M	R-27	1.05	8	1" x 7"	1.292	1" x 5-1/8"	0.969	1-5/8"	0.425
	RX-27	1.50							
2-9/16" 5M	R-27	1.05	8	1" x 7"	1.292	1" x 5-1/8"	0.969	1-5/8"	0.425
	RX-27	1.50							

**2.1 General Information (continued)**

**Table 1, Reference for Ring Gasket, Bolt, Tap End Stud and Wrench by Flange Size**

(ALL DIMENSIONS SHOWN IN INCHES)

Flange Size	Ring Gasket	Ring Gasket Weight Each (Lbs.)	No. of Bolts	Through Bolt	Bolt Weight Each (Lbs.)	Tap End Stud	Tap End Stud Weight Each (Lbs.)	Hex Nut Size Across Flats (wrench size)	Nut Weight Each (Lbs.)
2-9/16" 5M 17 SS TO SS	BX-153 SBX-153	0.632	8	1" x 6-1/2"	1.200	1" x 4-5/8"	0.877	1-5/8"	0.425
2-9/16" 5M 17 SS TO SV	BX-153 SBX-153	0.632	8	1" x 7-1/4"	1.338	1" x 5-3/8"	1.015	1-5/8"	0.425
2-9/16" 10M	BX-153	0.632	8	7/8" x 6-1/2"	0.921	7/8" x 4-3/8"	0.638	1-7/16"	0.297
2-9/16" 10M 6BX TO 17SV	BX-153 SBX-153	0.632	8	7/8" x 7-1/4"	1.027	7/8" x 5"	0.744	1-7/16"	0.297
2-9/16" 15M	BX-153	0.632	8	1" x 7-1/4"	1.338	1" x 4-7/8"	0.923	1-5/8"	0.425
2-9/16" 20M	BX-153	0.632	8	1-1/4" x 9-1/2"	2.850	1-1/4" x 6-1/4"	1.950	2"	0.786
3-1/8" 2M	R-31	1.13	8	3/4" x 5-3/4"	0.592	3/4" x 4-1/8"	0.437	1-1/4"	0.193
	RX-31	1.73							
3-1/8" 3M	R-31	1.13	8	7/8" x 6-1/2"	0.921	7/8" x 4-5/8"	0.673	1-7/16"	0.297
	RX-31	1.73							
3-1/8" 5M	R-35	1.25	8	1-1/8" x 7-3/4"	1.857	1-1/8" x 5-5/8"	1.378	1-13/16"	0.592
	RX-35	1.91							
3-1/8" 5M 17 SS TO SS	BX-154 SBX-154	0.875	8	1-1/8" x 7-1/4"	1.737	1-1/8" x 5-1/8"	1.258	1-13/16"	0.592
3-1/8" 5M 17 SS TO SV	BX-154 SBX-154	0.875	8	1-1/8" x 8"	1.917	1-1/8" x 5-3/4"	1.438	1-13/16"	0.592
3-1/16" 10M	BX-154	0.875	8	1" x 7-1/4"	1.338	1" x 5"	0.969	1-5/8"	0.425
3-1/16" 10M 6BX TO 17SV	BX-154 SBX-154	0.875	8	1" x 8"	1.477	1" x 5-3/4"	1.108	1-5/8"	0.425
3-1/16" 15M	BX-154	0.875	8	1-1/8" x 8"	1.917	1-1/8" x 5-1/2"	1.378	1-13/16"	0.592
3-1/16" 20M	BX-154	0.875	8	1-3/8" x 10-1/4"	3.759	1-3/8" x 6-3/4"	2.567	2-3/16"	1.020

**2.1 General Information (continued)**

**Table 1, Reference for Ring Gasket, Bolt, Tap End Stud and Wrench by Flange Size**

(ALL DIMENSIONS SHOWN IN INCHES)

Flange Size	Ring Gasket	Ring Gasket Weight Each (Lbs.)	No. of Bolts	Through Bolt	Bolt Weight Each (Lbs.)	Tap End Stud	Tap End Stud Weight Each (Lbs.)	Hex Nut Size Across Flats (wrench size)	Nut Weight Each (Lbs.)
4-1/16" 2M	R-37	1.36	8	7/8" x 6-1/2"	0.921	7/8" x 4-5/8"	0.673	1-7/16"	0.297
	RX-37	2.09							
4-1/16" 3M	R-37	1.36	8	1-1/8" x 7-1/2"	1.797	1-1/8" x 5-1/2"	1.378	1-13/16"	0.592
	RX-37	2.09							
4-1/16" 5M	R-39	1.48	8	1-1/4" x 8-1/2"	2.550	1-1/4" x 6-1/8"	1.875	2"	0.786
	RX-39	2.27							
4-1/16" 5M 17 SS TO SS	BX-155 SBX-155	1.22	8	1-1/4" x 8"	2.400	1-1/4" x 5-5/8"	1.725	2"	0.786
4-1/16" 5M 17 SS TO SV	BX-155 SBX-155	1.22	8	1-1/4" x 8-3/4"	2.625	1-1/4" x 6-1/4"	1.950	2"	0.786
4-1/16" 10M	BX-155	1.22	8	1-1/8" x 8-1/2"	2.037	1-1/8" x 5-3/4"	1.438	1-13/16"	0.592
4-1/16" 10M 6BX TO 17SV	BX-155 SBX-155	1.22	8	1-1/8" x 9-1/2"	2.276	1-1/8" x 6-5/8"	1.617	1-13/16"	0.592
4-1/16" 15M	BX-155	1.22	8	1-3/8" x 9-3/4"	3.575	1-3/8" x 6-1/2"	2.475	2-3/16"	1.020
4-1/16" 20M	BX-155	1.22	8	1-3/4" x 12-1/2"	7.630	1-3/4" x 8-3/8"	5.188	2-3/4"	2.040
5-1/8" 2M	R-41	1.66	8	1" x 7-1/4"	1.338	1" x 5-1/4"	1.015	1-5/8"	0.425
	RX-41	2.54							
5-1/8" 3M	R-41	1.66	8	1-1/4" x 8-1/4"	2.475	1-1/4" x 6"	1.875	2"	0.786
	RX-41	2.54							
5-1/8" 5M	R-44	1.77	8	1-1/2" x 10-1/2"	4.638	1-1/2" x 7-3/8"	3.313	2-3/8"	1.310
	RX-44	2.72							
5-1/8" 5M 17 SS TO SS	BX-169 SBX-169	1.74	8	1-1/2" x 10"	4.417	1-1/2" x 6-7/8"	3.092	2-3/8"	1.310
5-1/8" 5M 17 SS TO SV	BX-169 SBX-169	1.74	8	1-1/2" x 11"	4.859	1-1/2" x 7-3/4"	3.534	2-3/8"	1.310
5-1/8" 10M	BX-169	1.74	12	1-1/8" x 9-1/4"	2.216	1-1/8" x 6"	1.498	1-13/16"	0.592

**2.1 General Information (continued)**

**Table 1, Reference for Ring Gasket, Bolt, Tap End Stud and Wrench by Flange Size**

(ALL DIMENSIONS SHOWN IN INCHES)

Flange Size	Ring Gasket	Ring Gasket Weight Each (Lbs.)	No. of Bolts	Through Bolt	Bolt Weight Each (Lbs.)	Tap End Stud	Tap End Stud Weight Each (Lbs.)	Hex Nut Size Across Flats (wrench size)	Nut Weight Each (Lbs.)
5-1/8" 10M 6BX TO 17SV	BX-169 SBX-169	1.74	12	1-1/8" x 10-1/4"	2.456	1-1/8" x 7"	1.737	1-13/16"	0.592
5-1/8" 15M	BX-169	1.74	12	1-1/2" x 11-1/2"	5.080	1-1/2" x 7-5/8"	3.423	2-3/8"	1.310
7-1/16" 2M	R-45	1.93	12	1" x 7-1/2"	1.385	1" x 5-3/8"	1.015	1-5/8"	0.425
	RX-45	2.96							
7-1/16" 3M	R-45	1.93	12	1-1/8" x 8-1/2"	2.037	1-1/8" x 5-7/8"	1.438	1-13/16"	0.592
	RX-45	2.96							
7-1/16" 3M Flange to 7-1/16" 5M Studded	R or RX 45/46 Combination		12	-		1-1/8 x 1-3/8 x 6" Long Combination		1-13/16"	0.592
								2-3/16"	1.020
7-1/16" 3M Studded to 7-1/16" 5M Flange	R or RX 45/46 Combination		12	-		1-3/8 x 1-1/8 x 7" Long Combination		2-3/16"	1.020
								1-13/16"	0.592
7-1/16" 3M to 7-1/16" 5M	R or RX 45/46 Combination		12	1-1/8 x 1-3/8 x 10" Long Combination		-		1-13/16"	0.592
								2-3/16"	1.020
7-1/16" 5M	R-46	2.39	12	1-3/8" x 11-1/4"	4.125	1-3/8" x 7-1/2"	2.842	2-3/16"	1.020
	RX-46	3.66							
7-1/16" 5M 17 SS TO SS	BX-156 SBX-156	4.14	12	1-3/8" x 10-3/4"	3.942	1-3/8" x 7"	2.659	2-3/16"	1.020
7-1/16" 5M 17 SS TO SV	BX-156 SBX-156	4.14	12	1-3/8" x 11-3/4"	4.309	1-3/8" x 8-1/8"	3.025	2-3/16"	1.020
7-1/16" 10M	BX-156	4.14	12	1-1/2" x 11-3/4"	5.190	1-1/2" x 7-3/4"	3.534	2-3/8"	1.310
7-1/16" 10M 6BX TO 17SV	BX-156 SBX-156	4.14	12	1-1/2" x 13"	5.742	1-1/2" x 9"	4.086	2-3/8"	1.310
7-1/16" 15M	BX-156	4.14	16	1-1/2" x 13"	5.742	1-1/2" x 8-3/8"	3.754	2-3/8"	1.310
7-1/16" 20M	BX-156	4.14	16	2" x 17-3/4"	14.370	2" x 11-1/8"	9.108	3-1/8"	2.990

**2.1 General Information (continued)**

**Table 1, Reference for Ring Gasket, Bolt, Tap End Stud and Wrench by Flange Size**

(ALL DIMENSIONS SHOWN IN INCHES)

Flange Size	Ring Gasket	Ring Gasket Weight Each (Lbs.)	No. of Bolts	Through Bolt	Bolt Weight Each (Lbs.)	Tap End Stud	Tap End Stud Weight Each (Lbs.)	Hex Nut Size Across Flats (wrench size)	Nut Weight Each (Lbs.)
9" 2M	R-49	2.47	12	1-1/8" x 8-1/2"	2.037	1-1/8" x 5-7/8"	1.438	1-13/16"	0.592
	RX-49	3.79							
9" 3M	R-49	2.47	12	1-3/8" x 9-1/2"	3.484	1-3/8" x 6-3/4"	2.567	2-3/16"	1.020
	RX-49	3.79							
9" 3M Flange to 9" 5M Studded	R or RX 49/50 Combination		12	-		1-1/2 x 1-5/8 x 6-3/4" Long Combination			
9" 3M Studded to 9" 5M Flange	R or RX 49/50 Combination		12	-		1-5/8 x 1-1/2 x 8" Long Combination			
9" 3M to 9" 5M	R or RX 49/50 Combination		12	1-3/8 x 1-5/8 x 11" Long Combination		-			
9" 5M	R-50	4.40	12	1-5/8" x 12-1/2"	6.563	1-5/8" x 8-1/2"	4.594	2-9/16"	1.620
	RX-50	5.36							
9" 5M 17 SS TO SS	BX-157 SBX-157	6.55	12	1-5/8" x 12"	6.300	1-5/8" x 8"	4.331	2-9/16"	1.620
9" 5M 17 SS TO SV	BX-157 SBX-157	6.55	12	1-5/8" x 13-1/4"	6.956	1-5/8" x 9-1/8"	4.856	2-9/16"	1.620
9" 10M	BX-157	6.55	16	1-1/2" x 13-1/2"	5.963	1-1/2" x 8-1/2"	3.865	2-3/8"	1.310
9" 10M 6BX TO 17SV	BX-157 SBX-157	6.55	16	1-1/2" x 15"	6.626	1-1/2" x 10-1/8"	4.527	2-3/8"	1.310
9" 15M	BX-157	6.55	16	1-7/8" x 16"	11.286	1-7/8" x 10-1/8"	7.230	2-15/16"	2.410
9" 20M	BX-157	6.55	16	2-1/2" x 21-3/4"		2-1/2" x 13-3/4"	18.110	3-7/8"	5.640
11" 2M	R-53	3.00	16	1-1/4" x 9-1/4"	2.775	1-1/4" x 6-1/2"	2.025	2"	0.786
	RX-53	4.56							
11" 3M	R-53	3.00	16	1-3/8" x 10"	3.667	1-3/8" x 7"	2.659	2-3/16"	1.020
	RX-53	4.56							

**2.1 General Information (continued)**

**Table 1, Reference for Ring Gasket, Bolt, Tap End Stud and Wrench by Flange Size**

(ALL DIMENSIONS SHOWN IN INCHES)

Flange Size	Ring Gasket	Ring Gasket Weight Each (Lbs.)	No. of Bolts	Through Bolt	Bolt Weight Each (Lbs.)	Tap End Stud	Tap End Stud Weight Each (Lbs.)	Hex Nut Size Across Flats (wrench size)	Nut Weight Each (Lbs.)
11" 5M	R-54	5.29	12	1-7/8" x 14-1/4"	10.052	1-7/8" x 9-5/8"	6.878	2-15/16"	2.410
	RX-54	6.45							
11" 5M 17 SS TO SS	BX-158 SBX-158	9.60	12	1-7/8" x 13-3/4"	9.699	1-7/8" x 9-1/8"	6.525	2-15/16"	2.410
11" 5M 17 SS TO SV	BX-158 SBX-158	9.60	12	1-7/8" x 15-1/4"	10.757	1-7/8" x 10-1/2"	7.583	2-15/16"	2.410
11" 10M	BX-158	9.60	16	1-3/4" x 15-1/4"	9.309	1-3/4" x 9-3/4"	6.104	2-3/4"	2.040
11" 10M 6BX TO 17SV	BX-158 SBX-158	9.60	16	1-3/4" x 17"	10.377	1-3/4" x 11-1/2"	7.172	2-3/4"	2.040
11" 15M	BX-158	9.60	20	2" x 19-1/2"	15.787	2" x 12"	9.918	3-1/8"	2.990
11" 20M	BX-158	9.60	16	2-3/4" x 23-3/4"		2-3/4" x 15"		4-1/4"	7.380
13-5/8" 2M	R-57	3.48	20	1-1/4" x 9-1/2"	2.850	1-1/4" x 6-5/8"	2.025	2"	0.786
	RX-57	5.36							
13-5/8" 3M	R-57	3.48	20	1-3/8" x 10-3/4"	3.942	1-3/8" x 7-3/8"	2.750	2-3/16"	1.020
	RX-57	5.36							
13-5/8" 5M	BX-160	6.75	16	1-5/8" x 12-3/4"	6.694	1-5/8" x 8-3/8"	4.463	2-9/16"	1.620
13-5/8" 10M	BX-159	14.41	20	1-7/8" x 17-3/4"	12.521	1-7/8" x 11"	7.936	2-15/16"	2.410
13-5/8" 10M 6BX TO 17SV	BX-159 SBX-159	14.41	20	1-7/8" x 19-3/4"	13.932	1-7/8" x 13-1/8"	9.347	2-15/16"	2.410
13-5/8" 15M	BX-159	14.41	20	2-1/4" x 21-1/4"		2-1/4" x 13-1/4"	13.995	3-1/2"	4.190
13-5/8" 20M	BX-159	14.41	20	3" x 29-3/4"		3" x 18-1/8"		4-5/8"	9.500
16-3/4" 2M	R-65	4.30	20	1-1/2" x 10-3/4"	4.748	1-1/2" x 7-1/2"	3.423	2-3/8"	1.310
	RX-65	6.63							
16-3/4" 3M	R-66	7.68	20	1-5/8" x 12-1/4"	6.431	1-5/8" x 8-3/8"	4.463	2-9/16"	1.620
	RX-66	9.39							

## 2.1 General Information (continued)

**Table 1, Reference for Ring Gasket, Bolt, Tap End Stud and Wrench by Flange Size**

(ALL DIMENSIONS SHOWN IN INCHES)

Flange Size	Ring Gasket	Ring Gasket Weight Each (Lbs.)	No. of Bolts	Through Bolt	Bolt Weight Each (Lbs.)	Tap End Stud	Tap End Stud Weight Each (Lbs.)	Hex Nut Size Across Flats (wrench size)	Nut Weight Each (Lbs.)
16-3/4" 5M	BX-162	4.75	16	1-7/8" x 14-3/4"	10.405	1-7/8" x 9-1/2"	6.878	2-15/16"	2.410
16-3/4" 10M	BX-162	4.75	24	1-7/8" x 17-3/4"	12.521	1-7/8" x 11"	7.936	2-15/16"	2.410
18-3/4" 5M	BX-163	14.375	20	2" x 17-3/4"	14.370	2" x 11-1/4"	9.310	3-1/8"	2.990
18-3/4" 10M	BX-164	21.00	24	2-1/4" x 22-3/4"		2-1/4" x 14"	14.773	3-1/2"	4.190
18-3/4" 15M	BX-164	21.00	20	3" x 26-3/4"		3" x 16-3/4"		4-5/8"	9.500
20-3/4" 3M	R-74	12.95	20	2" x 15"	12.144	2" x 10-1/8"	8.298	3-1/8"	2.990
	RX-74	22.10							
21-1/4" 2M	R-73	6.60	24	1-5/8" x 12-1/4"	6.431	1-5/8" x 8-3/8"	4.463	2-9/16"	1.620
	RX-73	11.63							
21-1/4" 5M	BX-165	18.375	24	2" x 19"	15.382	2" x 11-3/4"	9.715	3-1/8"	2.990
21-1/4" 10M	BX-166	27.50	24	2-1/2" x 24-3/4"		2-1/2" x 15-1/8"	19.727	3-7/8"	5.640
26-3/4" 2M	BX-167	18.00	20	1-3/4" x 14-1/4"	8.698	1-3/4" x 9-1/8"	5.646	2-3/4"	2.040
26-3/4" 3M	BX-168	24.50	24	2" x 17-1/2"	14.168	2" x 11"	9.108	3-1/8"	2.990
30" 300 MSS <sup>1</sup>	R-95		28	1-3/4" x 13-1/2"	8.240	1-3/4" x 9-1/8"	5.646	2-3/4"	2.040
	RX-95								
30" 600 MSS <sup>1,2</sup>	R-95		28	2" x 15-3/4"	12.751	2" x 10-1/2"	8.703	3-1/8"	2.990
	RX-95								
30" 900 MSS <sup>1,2</sup>	R-102		20	3" x 20-1/2"		3" x 14"		4-5/8"	9.500
	RX-102								
30" 2M	BX-303		32	1-5/8" x 14-1/2"	7.613	1-5/8" x 9-1/4"	4.988	2-9/16"	1.620
30" 3M	BX-303		32	1-7/8" x 17-3/4"	12.521	1-7/8" x 11"	7.936	2-15/16"	2.410

<sup>1</sup> Not API, See MSS SP-44 published by the Manufacturers Standardization Society.

<sup>2</sup> This MSS flange requires longer bolts for connections between full bore flanges and blind flanges.

## 2.2 Ring Gaskets to fit API Spec 6A Flanges

API originally adopted many of the dimensions of the original flanges designated 6B from the RTJ flanges as now listed in ANSI/ASME B16.5. API adopted the same seal rings as well.

As API specifications evolved and operators encountered higher pressures, API developed new ring gaskets and new flanges.

The RX "pressure energized ring gasket" fits "interchangeably" into API 6B flange ring grooves (view a caution concerning interchanging R and RX ring gaskets in the **Flange Make-up Stand-off and Drift** section of Web Site Tools on [www.woodcousa.com](http://www.woodcousa.com)).

As higher pressure flanges came online, API introduced the BX ring gasket, then as newer lower pressure flanges appeared, they too had ring grooves to accept BX ring gaskets.

The most recent ring gasket designs have the designation SBX and SRX, which have the same dimensions as BX and RX ring gaskets with a special vent hole added to facilitate make-up underwater allowing trapped water to escape from behind the gasket.

Although ring gaskets specified by API, fit and seal flanges and hubs appearing in API Spec 6A, 16A, 17D etc., this catalog identifies gaskets by alpha type, number, and material, and shall have individual identification, e.g. R 24 S316-4 with what they fit specifically identified by reference in [Table 1](#) Page 6 of this catalog.








Table 1 provides reference for the ring gasket, bolt, tap end stud, and wrench for flanges specified in API 6A, 16A, and 17D etc..

## 2.3 Ring Gaskets to fit API Spec 16A Hubs

To View a list of currently specified API Spec 16A hubs and the designated ring gaskets specified to fit these hubs, go to **Hub and Clamp Reference Chart** section of Web Site Tools on [www.woodcousa.com](http://www.woodcousa.com).

If you find that hubs you may have require a ring gasket other than ones currently specified by API, you probably have older hub designs not adopted by API, now discontinued. These discontinued hubs appear in the **Hub and Clamp Reference Chart** mentioned above, with asterisks indicating their Non-API status.

## 2.4 Ring Gasket Profile Designs Illustrated and Explained

R TYPE	R TYPE	R TYPE	RX TYPE	SRX TYPE	BX TYPE	SBX TYPE
						
OVAL RING GASKET	OCTAGONAL RING GASKET	COMBINATION RING GASKET	PRESSURE ENERGIZED RING GASKET	PRESSURE ENERGIZED SUBSEA RING GASKET	PRESSURE ENERGIZED RING GASKET	PRESSURE ENERGIZED SUBSEA RING GASKET

The illustrations show the various types of API ring gaskets in cross-section. Except for the offering of styles of R type ring gaskets, each gasket shown has a special intended purpose and in some cases a clear advantage in application. API does not specify pressure balancing holes in all RX ring gaskets as illustrated above. All RX ring gaskets without these holes may have modification to include pressure balancing holes. All RX and BX ring gaskets may also have vent holes to the equipment bores to facilitate subsea make-up of connections (see the profiles of SRX and SBX ring gaskets).



R TYPE  
OVAL RING  
GASKET

R type oval ring gaskets have the greatest application of all ring gaskets used in industry today. These gaskets fit API 6B and ASME B16.5 flanges. Oval type R gaskets fit all current specification ring grooves, as well as "round bottom" ring grooves found in some older flanges.



R TYPE  
OCTAGONAL  
RING GASKET

R type octagonal ring gaskets offer an alternative to the more common (for wellheads) R type oval ring gasket. These gaskets also fit API 6B and ASME B16.5 flanges. R type octagonal ring gaskets fit all current specification ring grooves, but operators must use care to avoid their use in "round bottom" ring grooves found in some older flanges.



R TYPE  
COMBINATION  
RING GASKET

R type combination ring gaskets have different designations on each side. Combination ring gaskets allow the connection of flanges, with the same bolt circle measurement and number of bolt holes, that have different designated gaskets. (Such connected flanges may or may not require specially dimensioned bolts).



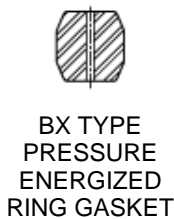
RX TYPE  
PRESSURE  
ENERGIZED  
RING GASKET

RX type ring gaskets have a non-symmetrical octagonal cross-section. This non-symmetrical geometry provides an unbalanced contact with the flange ring groove resulting in coining and sealing on the O.D. of the gasket only. The RX type ring gasket geometry provides a pressure-energized self sealing effect. RX type ring gaskets increase the stand-off between flange faces and flange bolt length must accommodate this additional stand-off.

**2.4 Ring Gasket Profile Designs Illustrated and Explained (continued)**



SRX type ring gaskets have dimensions identical to RX type ring gaskets. SRX type ring gaskets have a special "vent" hole allowing the under water assembly of flanges. This "vent" hole permits water trapped behind the ring gasket to escape into the assembled equipment bore. All RX gasket sizes may accept modification to the SRX design to facilitate under water assembly of flanges, or retightening should a flange connection leak on first test.



BX type ring gaskets fit only API flanges designated as 6BX specified in API Spec 6A or 17D flanges specified in Spec 17D. Flanges that utilize BX type ring gaskets have designs that allow face to face contact of the made-up flange connection.



SBX type ring gaskets have dimensions identical to BX type ring gaskets. SBX type ring gaskets have a special "vent" hole allowing the under water assembly of flanges. This "vent" hole permits water trapped behind the ring gasket to escape into the assembled equipment bore.

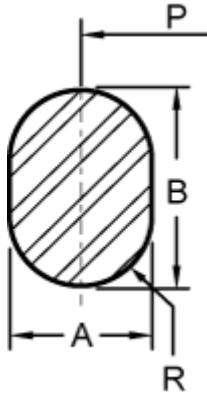
API product specification levels (PSL's) do not apply to ring gaskets. All ring gaskets marked as in Table 2 below, and bearing the API Monogram, have application for PSL's 1, 2, 3, and 4 with no distinction. They may have forged, centrifugal cast, or rolled and welded construction.

**Table 2 Ring Gasket Material and Marking.**

Material	Maximum Hardness	Mark
Soft Iron	56 HRB	D-4*
Carbon and low-alloy steel	68 HRB	S-4*
304 stainless steel	83 HRB	S304-4
316 stainless steel	83 HRB	S316-4
Nickel alloy UNS N08825	92 HRB	825-4
Other CRA materials	Hardness shall meet manufacturer's written specification.	UNS number-4

\* Carbon steel gaskets may meet the requirements of soft iron and may have dual marking D-4 / S-4.

## 2.5 Ring Gasket Tables

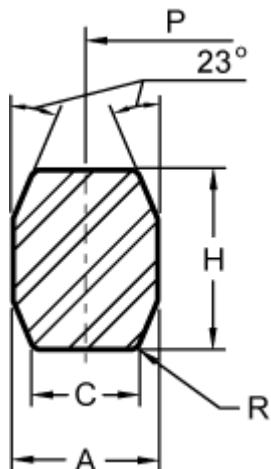


Reference [Table 1](#) of this catalog for gasket weight and to identify which gasket fits which flange. Reference [Table 2](#) for gasket material.

**Table 3 R Type Oval Ring Gaskets**

Ring number	Pitch diameter of ring	Width of ring	Height of ring	Radius Typ.
	P	A	B	R
R 20	2.688	0.313	0.56	0.156
R 23	3.250	0.438	0.69	0.219
R 24	3.750	0.438	0.69	0.219
R 26	4.000	0.438	0.69	0.219
R 27	4.250	0.438	0.69	0.219
R 31	4.875	0.438	0.69	0.219
R 35	5.375	0.438	0.69	0.219
R 37	5.875	0.438	0.69	0.219
R 39	6.375	0.438	0.69	0.219
R 41	7.125	0.438	0.69	0.219
R 44	7.625	0.438	0.69	0.219
R 45	8.313	0.438	0.69	0.219
R 46	8.313	0.500	0.75	0.25
R 47	9.000	0.750	1.00	0.375
R 49	10.625	0.438	0.69	0.219
R 50	10.625	0.625	0.88	0.313
R 53	12.750	0.438	0.69	0.219
R 54	12.750	0.625	0.88	0.313
R 57	15.000	0.438	0.69	0.219
R 63	16.500	1.000	1.31	0.5
R 65	18.500	0.438	0.69	0.219
R 66	18.500	0.625	0.88	0.313
R 69	21.000	0.438	0.69	0.219
R 70	21.000	0.750	1.00	0.375
R 73	23.000	0.500	0.75	0.25
R 74	23.000	0.750	1.00	0.375
R 82	2.250	0.438	-	0.219
R 84	2.500	0.438	-	0.219
R 85	3.125	0.500	-	0.25
R 86	3.563	0.625	-	0.313
R 87	3.938	0.625	-	0.313
R 88	4.875	0.750	-	0.375
R 89	4.500	0.750	-	0.375
R 90	6.125	0.875	-	0.438
R 91	10.250	1.250	-	0.625
R 99	9.250	0.438	-	0.219

**2.5 Ring Gasket Tables (continued)**



Reference [Table 1](#) of this catalog for gasket weight and to identify which gasket fits which flange. Reference [Table 2](#) for gasket material.

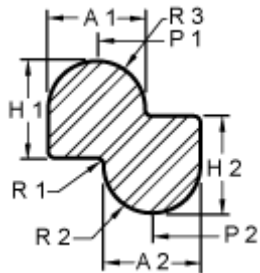
**Table 4 R Type Octagonal Ring Gaskets**

Ring number	Pitch diameter of Ring <b>P</b>	Height of Octagonal Ring <b>H</b>	Width of flat of Octagonal Ring Typ. <b>C</b>	Corner Radius Octagonal Ring Typ. <b>R</b>
R 20	2.688	0.50	0.206	0.06
R 23	3.250	0.63	0.305	0.06
R 24	3.750	0.63	0.305	0.06
R 26	4.000	0.63	0.305	0.06
R 27	4.250	0.63	0.305	0.06
R 31	4.875	0.63	0.305	0.06
R 35	5.375	0.63	0.305	0.06
R 37	5.875	0.63	0.305	0.06
R 39	6.375	0.63	0.305	0.06
R 41	7.125	0.63	0.305	0.06
R 44	7.625	0.63	0.305	0.06
R 45	8.313	0.63	0.305	0.06
R 46	8.313	0.69	0.341	0.06
R 47	9.000	0.94	0.485	0.06
R 49	10.625	0.63	0.305	0.06
R 50	10.625	0.81	0.413	0.06
R 53	12.750	0.63	0.305	0.06
R 54	12.750	0.81	0.413	0.06
R 57	15.000	0.63	0.305	0.06
R 63	16.500	1.25	0.681	0.09
R 65	18.500	0.63	0.305	0.06
R 66	18.500	0.81	0.413	0.06
R 69	21.000	0.63	0.305	0.06
R 70	21.000	0.94	0.485	0.06
R 73	23.000	0.69	0.341	0.06
R 74	23.000	0.94	0.485	0.06
R 82	2.250	0.63	0.305	0.06
R 84	2.500	0.63	0.305	0.06
R 85	3.125	0.69	0.341	0.06
R 86	3.563	0.81	0.413	0.06
R 87	3.938	0.81	0.413	0.06
R 88	4.875	0.94	0.485	0.06
R 89	4.500	0.94	0.485	0.06
R 90	6.125	1.06	0.583	0.06
R 91	10.250	1.50	0.879	0.09
R 99	9.250	0.63	0.305	0.06

## 2.5 Ring Gasket Tables (continued)

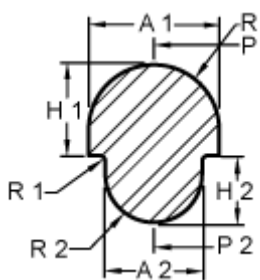
Reference [Table 1](#) of this catalog for gasket weight and to identify which gasket fits which flange. Reference [Table 2](#) for gasket material.

**Table 5** R Type Combination Gaskets  
 (different pitch diameter)



Ring number	Pitch diameter of larger ring	Pitch diameter of smaller ring	Width of larger ring	Width of smaller ring	Height of larger ring	Height of smaller ring	Corner Radius Typ.	Radius Typ.	Radius Typ.
	P 1	P 2	A 1	A 2	H 1	H 2	R 1	R 2	R 3
R23/R24	3.750	3.250	0.438	0.438	0.36	0.36	0.03	0.219	0.219
R26/R27	4.250	4.000	0.438	0.438	0.36	0.36	0.03	0.219	0.219

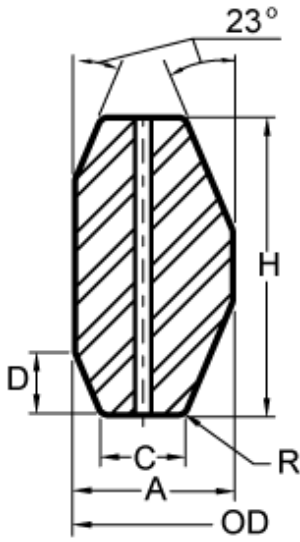
**Table 6** R Type Combination Gaskets  
 (same pitch diameter)



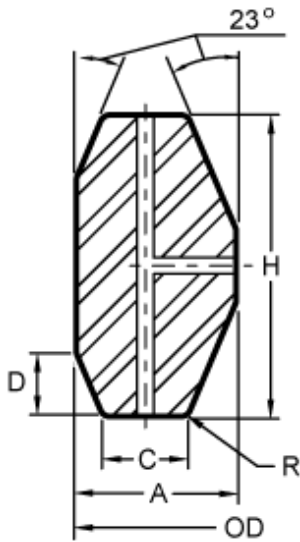
Ring number	Pitch diameter of larger ring	Pitch diameter of smaller ring	Width of larger ring	Width of smaller ring	Height of larger ring	Height of smaller ring	corner Radius Typ.	Radius Typ.	Radius Typ.
	P 1	P 2	A 1	A 2	H 1	H 2	R 1	R 2	R 3
R45/R46	8.313	8.313	0.500	0.438	0.38	0.34	0.03	0.219	0.25
R49/R50	10.625	10.625	0.625	0.438	0.45	0.34	0.03	0.219	0.313

**2.5 Ring Gasket Tables (continued)**

Reference [Table 1](#) of this catalog for gasket weight and to identify which gasket fits which flange. Reference [Table 2](#) for gasket material.



\*All RX Gasket sizes may accept modification to the SRX design, as a non API monogram gasket, to facilitate underwater assembly of flanges, or retightening should a connection leak on first test.



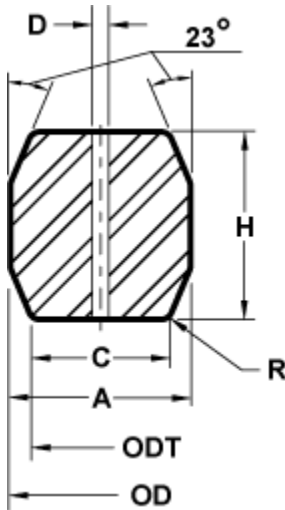
RX Ring Gasket with SRX modification recommended for 304, 316 and CRA only.

**Table 7 Type RX Pressure Energized Ring Gaskets\***

Ring number	Outside diameter of ring OD	Width of ring A	Width of flat Typ. C	Height of outside bevel Typ. D	Height of ring H	Corner Radius of ring Typ. R
RX 20	3.000	0.344	0.182	0.125	0.750	0.06
RX 23	3.672	0.469	0.254	0.167	1.000	0.06
RX 24	4.172	0.469	0.254	0.167	1.000	0.06
RX 25	4.313	0.344	0.182	0.125	0.750	0.06
RX 26	4.406	0.469	0.254	0.167	1.000	0.06
RX 27	4.656	0.469	0.254	0.167	1.000	0.06
RX 31	5.297	0.469	0.254	0.167	1.000	0.06
RX 35	5.797	0.469	0.254	0.167	1.000	0.06
RX 37	6.297	0.469	0.254	0.167	1.000	0.06
RX 39	6.797	0.469	0.254	0.167	1.000	0.06
RX 41	7.547	0.469	0.254	0.167	1.000	0.06
RX 44	8.047	0.469	0.254	0.167	1.000	0.06
RX 45	8.734	0.469	0.254	0.167	1.000	0.06
RX 46	8.750	0.531	0.263	0.188	1.125	0.06
RX 47	9.656	0.781	0.407	0.271	1.625	0.09
RX 49	11.047	0.469	0.254	0.167	1.000	0.06
RX 50	11.156	0.656	0.335	0.208	1.250	0.06
RX 53	13.172	0.469	0.254	0.167	1.000	0.06
RX 54	13.281	0.656	0.335	0.208	1.250	0.06
RX 57	15.422	0.469	0.254	0.167	1.000	0.06
RX 63	17.391	1.063	0.582	0.333	2.000	0.09
RX 65	18.922	0.469	0.254	0.167	1.000	0.06
RX 66	19.031	0.656	0.335	0.208	1.250	0.06
RX 69	21.422	0.469	0.254	0.167	1.000	0.06
RX 70	21.656	0.781	0.407	0.271	1.625	0.09
RX 73	23.469	0.531	0.263	0.208	1.250	0.06
RX 74	23.656	0.781	0.407	0.271	1.625	0.09
RX 82	2.672	0.469	0.254	0.167	1.000	0.06
RX 84	2.922	0.469	0.254	0.167	1.000	0.06
RX 85	3.547	0.531	0.263	0.167	1.000	0.06
RX 86	4.078	0.594	0.335	0.188	1.125	0.06
RX 87	4.453	0.594	0.335	0.188	1.125	0.06
RX 88	5.484	0.688	0.407	0.208	1.250	0.06
RX 89	5.109	0.719	0.407	0.208	1.250	0.06
RX 90	6.875	0.781	0.479	0.292	1.750	0.09
RX 91	11.297	1.188	0.780	0.297	1.781	0.09
RX 99	9.672	0.469	0.254	0.167	1.000	0.06
RX 201**	2.026	0.226	0.126	0.057	0.445	0.02
RX 205**	2.453	0.219	0.120	0.072	0.437	0.02
RX 210**	3.844	0.375	0.213	0.125	0.750	0.03
RX 215**	5.547	0.469	0.210	0.167	1.000	0.06

\*\* RX 201, 205, 210, and 215 appeared in API Spec 17D 1st Edition, as the only API specified SRX ring gaskets.

**2.5 Ring Gasket Tables (continued)**



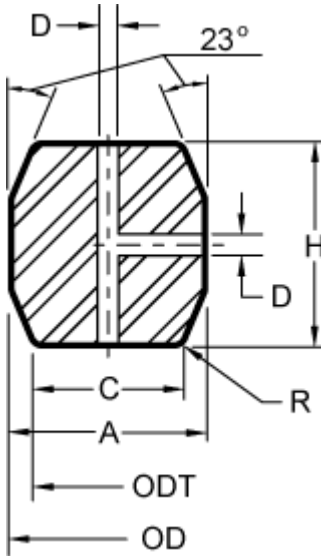
Reference [Table 1](#) of this catalog for gasket weight and to identify which gasket fits which flange. Reference [Table 2](#) for gasket material.

**Table 8 Type BX Pressure Energized Ring Gaskets\***

Ring number	Nominal size	Outside diameter of ring	Height of ring	Width of ring	Diameter of flat	Width of flat Typ.	Hole size	Corner Radius Typ.
		OD	H	A	ODT	C	D	R
<b>BX 150</b>	1-11/16	2.842	0.366	0.366	2.790	0.314	0.06	0.06
<b>BX 151</b>	1-13/16	3.008	0.379	0.379	2.954	0.325	0.06	0.06
<b>BX 152</b>	2-1/16	3.334	0.403	0.403	3.277	0.346	0.06	0.06
<b>BX 153</b>	2-9/16	3.974	0.448	0.448	3.910	0.385	0.06	0.06
<b>BX 154</b>	3 1/16	4.600	0.488	0.488	4.531	0.419	0.06	0.06
<b>BX 155</b>	4-/16	5.825	0.560	0.560	5.746	0.481	0.06	0.06
<b>BX 156</b>	7-1/16	9.367	0.733	0.733	9.263	0.629	0.12	0.06
<b>BX 157</b>	9	11.593	0.826	0.826	11.476	0.709	0.12	0.06
<b>BX 158</b>	11	13.860	0.911	0.911	13.731	0.782	0.12	0.06
<b>BX 159</b>	13-5/8	16.800	1.012	1.012	16.657	0.869	0.12	0.06
<b>BX 160</b>	13-5/8	15.850	0.938	0.541	15.717	0.408	0.12	0.12
<b>BX 161</b>	16-3/4	19.347	1.105	0.638	19.191	0.482	0.12	0.12
<b>BX 162</b>	16-3/4	18.720	0.560	0.560	18.641	0.481	0.06	0.06
<b>BX 163</b>	18-3/4	21.896	1.185	0.684	21.728	0.516	0.12	0.12
<b>BX 164</b>	18-3/4	22.463	1.185	0.968	22.295	0.800	0.12	0.12
<b>BX 165</b>	21-1/4	24.595	1.261	0.728	24.417	0.550	0.12	0.12
<b>BX 166</b>	21-1/4	25.198	1.261	1.029	25.020	0.851	0.12	0.12
<b>BX 167</b>	26-3/4	29.896	1.412	0.516	29.696	0.316	0.06	0.06
<b>BX 168</b>	26-3/4	30.128	1.412	0.632	29.928	0.432	0.06	0.06
<b>BX 169</b>	5-1/8	6.831	0.624	0.509	6.743	0.421	0.06	0.06
<b>BX 170</b>	9	8.584	0.560	0.560	8.505	0.481	0.06	0.06
<b>BX 171</b>	11	10.529	0.560	0.560	10.450	0.481	0.06	0.06
<b>BX 172</b>	13-5/8	13.113	0.560	0.560	13.034	0.481	0.06	0.06
<b>BX303</b>	30	33.573	1.494	0.668	33.361	0.457	0.06	0.06

\* Use SBX gaskets to facilitate underwater assembly of flanges, or retightening should a connection leak on first test. WOODCO USA can modify / convert all BX ring gaskets shown in this table to the SBX design see Table 9, page 21.

**2.5 Ring Gasket Tables (continued)**



Reference [Table 1](#) of this catalog for gasket weight and to identify which gasket fits which flange. Reference [Table 2](#) for gasket material.

**Table 9 Type SBX Pressure Energized Ring Gaskets\***

Ring number	Nominal size	Outside diameter of ring	Height of ring	Width of ring	Diameter of flat	Width of flat Typ.	Hole size	Corner Radius Typ.
		OD	H	A	ODT	C	D	R
<b>SBX 151</b>	1-13/16	3.008	0.379	0.379	2.954	0.325	0.06	0.06
<b>SBX 152</b>	2-1/16	3.334	0.403	0.403	3.277	0.346	0.06	0.06
<b>SBX 153</b>	2-9/16	3.974	0.448	0.448	3.910	0.385	0.06	0.06
<b>SBX 154</b>	3-1/16	4.600	0.488	0.488	4.531	0.419	0.06	0.06
<b>SBX 155</b>	4-1/16	5.825	0.560	0.560	5.746	0.481	0.06	0.06
<b>SBX 156</b>	7/16	9.367	0.733	0.733	9.263	0.629	0.12	0.12
<b>SBX 157</b>	9	11.593	1.026	0.826	11.476	0.709	0.12	0.12
<b>SBX 158</b>	11	13.860	1.011	0.911	13.731	0.782	0.12	0.12
<b>SBX 159</b>	13-5/8	16.800	1.012	1.012	16.657	0.869	0.12	0.12
<b>SBX 160</b>	13-5/8	15.850	0.938	0.541	15.717	0.408	0.12	0.12
<b>SBX 161</b>	16-3/4	19.347	1.105	0.638	19.191	0.482	0.12	0.12
<b>SBX 162</b>	16-3/4	18.720	0.560	0.560	18.641	0.481	0.06	0.06
<b>SBX 163</b>	18-3/4	21.896	1.185	0.684	21.728	0.516	0.12	0.12
<b>SBX 164</b>	18-3/4	22.463	1.185	0.968	22.295	0.800	0.12	0.12
<b>SBX 165</b>	21-1/4	24.595	1.261	0.728	24.417	0.550	0.12	0.12
<b>SBX 166</b>	21-1/4	25.198	1.261	1.029	25.020	0.851	0.12	0.12
<b>SBX 169</b>	5-1/8	6.831	0.624	0.509	6.743	0.421	0.06	0.06

\* Use SBX gaskets to facilitate underwater assembly of flanges, or retightening should a connection leak on first test. WOODCO USA can modify / convert any existing BX ring gasket to the SBX design including ring gaskets not shown in this table.

### 3.0 Fasteners

#### 3.1 Bolts for API 6A, 6BX, 16A and 17D Flanges.

API specifies bolts and nuts for all standard flanges referencing various ASTM specifications, WOODCO USA offers bolts and nuts meeting API requirements and also meeting ASTM A 320 and ASTM A 194 for all API temperature service. Commonly known as grade L7 bolts and 2H heavy hex nuts. All bolts and tap end studs sold by WOODCO USA have had CVN tests at -150°F.

All bolts, tap end studs, and nuts through 1" size shall have national course threads, bolt and nut sizes larger than 1" shall have 8UN threads.

Unless otherwise specified, low alloy bolts, tap end studs, and nuts for surface connections shall have zinc plating.

Low alloy bolts, tap end studs, and nuts for subsea applications shall have Fluoropolymer coating.

#### 3.2 Bolts, Spherical Washers, and Safety Hoist Rings, as Replacement parts for Clamps to Fit API Spec 16A Hubs.

API specifies design criteria for clamps to connect API Spec 16A hubs, but does not specify clamp dimensions. Specific dimensions of clamps made by different manufacturers' may vary. To view and order parts for WOODCO USA made clamps, reference the WOODCO USA **Catalog for Clamps for Clamp Hub Connections** on the [www.woodcousa.com](http://www.woodcousa.com) web site.

If you cannot identify the manufacturer or size of a clamp that you may already have, that you believe may fit API Spec 16A hubs, see page 16 of the WOODCO USA **Catalog for Clamps for Clamp Hub Connections** on the [www.woodcousa.com](http://www.woodcousa.com) web site.

[www.woodcousa.com](http://www.woodcousa.com)

To obtain parts for clamps made by an unknown manufacturer:

Measure the existing bolt length (L) and diameter (D) and order like replacements with nuts (N).

Request replacement spherical or self aligning washers to fit the bolt size

Request replacement safety hoist rings by diameter of the threaded screw (D).

Replacement bolts, nuts, and spherical washers supplied by WOODCO USA shall have Fluoropolymer coating.

Bolts and Tap End Studs meet the requirements of ASTM A320 GR-L7.

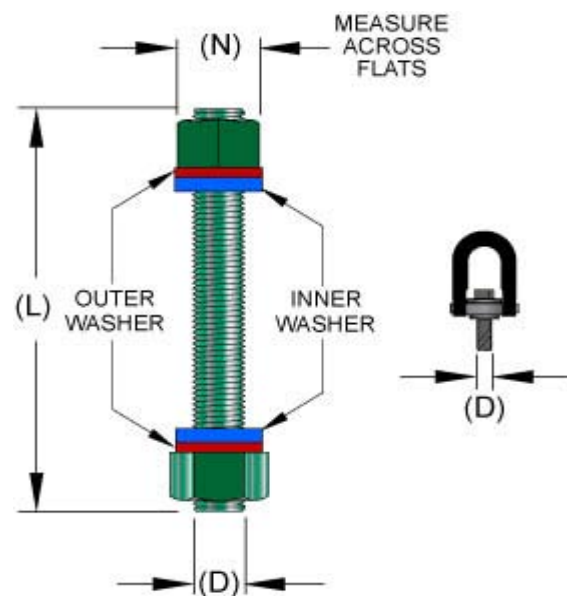
Nuts meet the requirements of ASTM A193 GR-2H.

Bolts and nuts, Green

Outer washers (load), Red

Inner washers (bearing), Blue

**Figure 1**

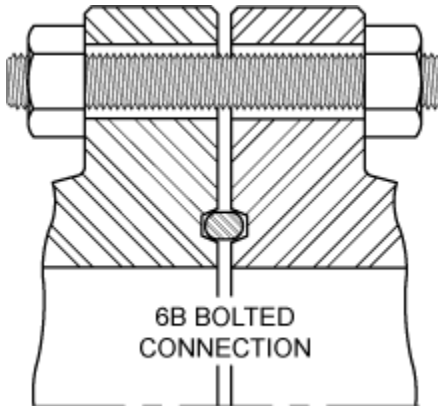


### 3.3 Fastener Illustrations

#### Flange All Thread Stud Bolts Illustrated as Installed.

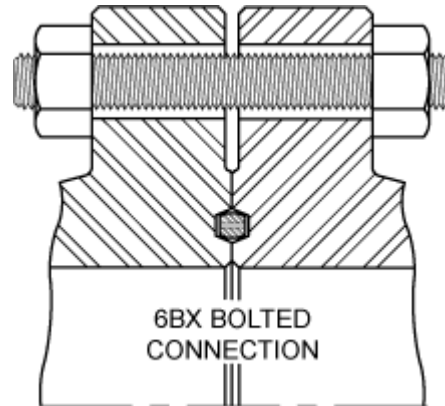
All Thread through bolts with 2 nuts each, fit API specified flanges as shown in the illustrations below. Bolts for API 6B flanges shall have sufficient length to accommodate RX gaskets. Bolts and nuts for subsea applications shall have Fluoropolymer coating.

**Figure 2**



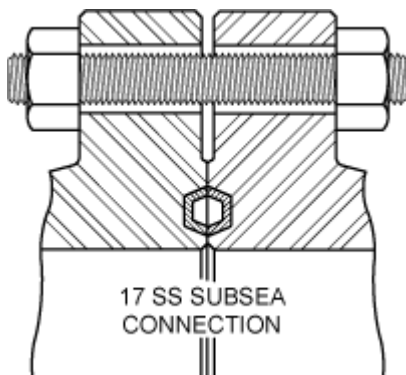
6B Flanges illustrated as specified in API Spec 6A.

**Figure 3**



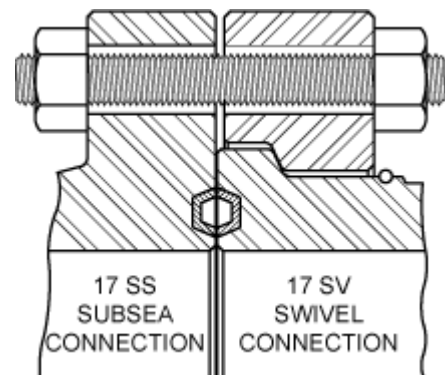
6BX Flanges illustrated as specified in API Spec 6A.

**Figure 4**



17SS Flanges illustrated as specified in API Spec 17D.

**Figure 5**



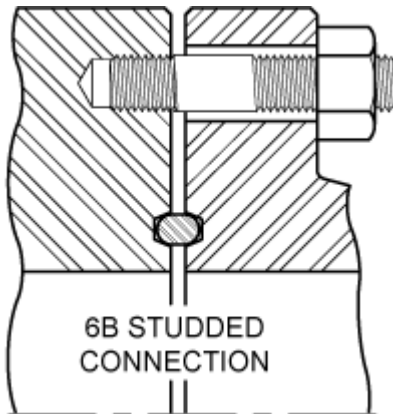
17SS and 17SV Flanges illustrated as specified in API Spec 17D.

### 3.3 Fastener Illustrations (continued)

#### Flange Tap End Studs Illustrated as Installed.

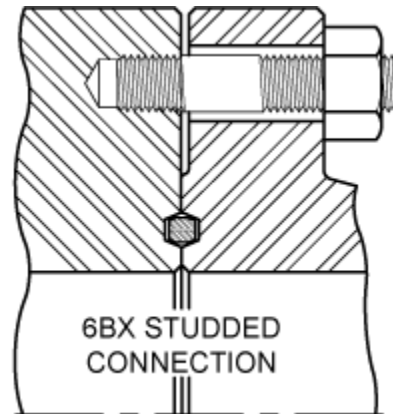
Tap End (Thread Anchored) Studs with one nut each, fit API specified flanges as shown in the illustrations below. Tap End Studs for API 6B flanges shall have sufficient length to accommodate RX gaskets. Tap end studs and nuts for subsea applications shall have Fluoropolymer coating.

**Figure 6**



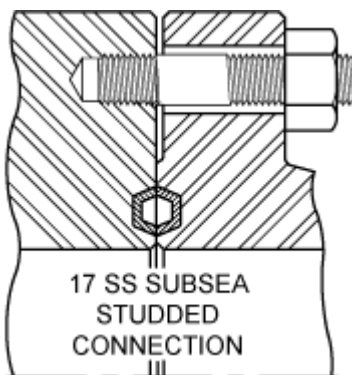
6B Flanges illustrated as specified in API Spec 6A.

**Figure 7**



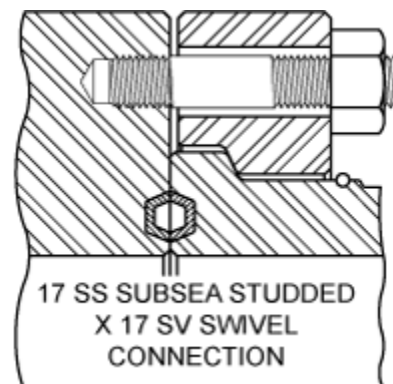
6BX Flanges illustrated as specified in API Spec 6A.

**Figure 8**



17SS Flanges illustrated as specified in API Spec 17D.

**Figure 9**

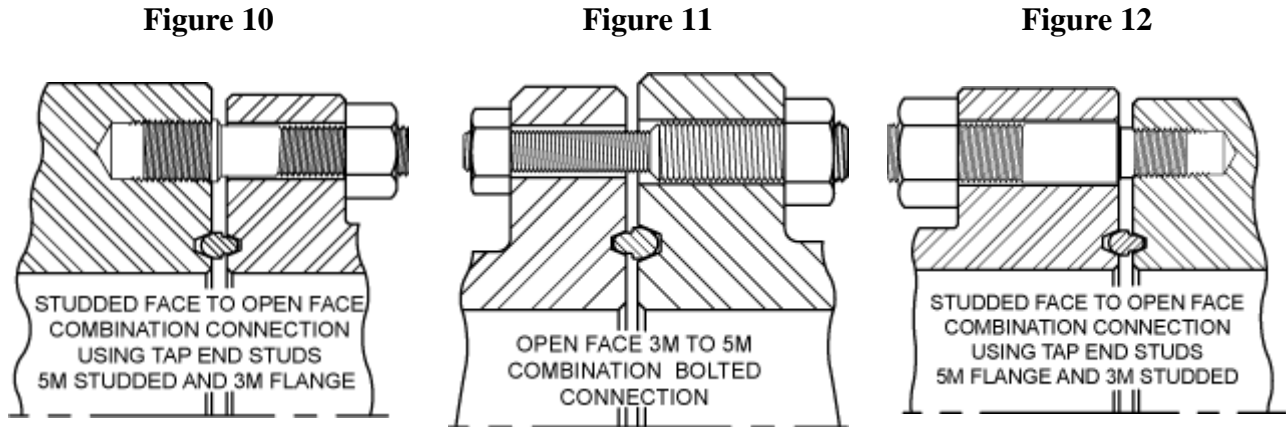


17SS and 17SV Flanges illustrated as specified in API Spec 17D.

### 3.3 Fastener Illustrations (continued)

#### Special Flange Combination Stud Bolts and Ring Gaskets Illustrated as Installed.

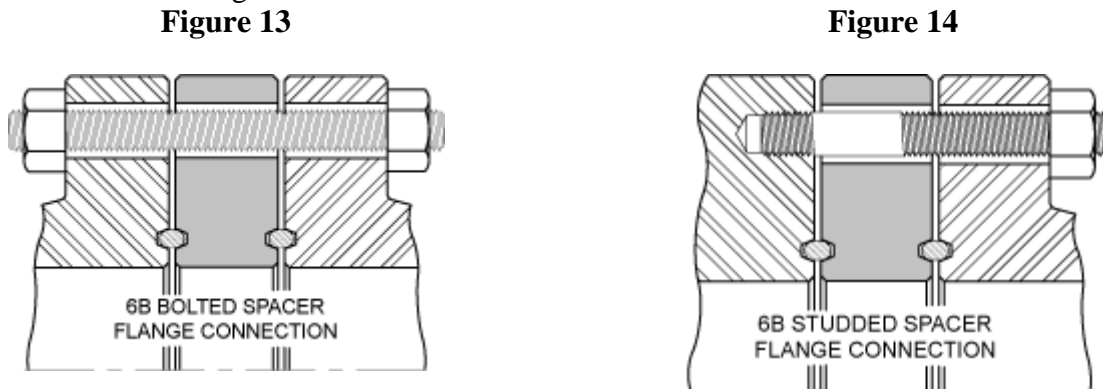
Special bolts with 2 diameters, fit API specified flanges as shown in the illustration below. The flanges seal with a special combination ring gasket.



API Spec 6A Flanges Sizes 7-1/16" 3M and 7-1/16" 5M, 9" 3M and 9" 5M may connect directly using special combination ring gaskets and bolts.

#### Special Length, All Thread Stud Bolts and Tap End Studs as Installed.

Operators may request special length stud bolts and tap end studs that accommodate the addition of Instrument and Spacer Flanges. For 6B flanges, the length must allow for R or RX ring gasket's standoff between flanges.



Open Face Flange illustrated with Instrument or Spacer Flange.

Studded Face Flange illustrated with Instrument or Spacer Flange

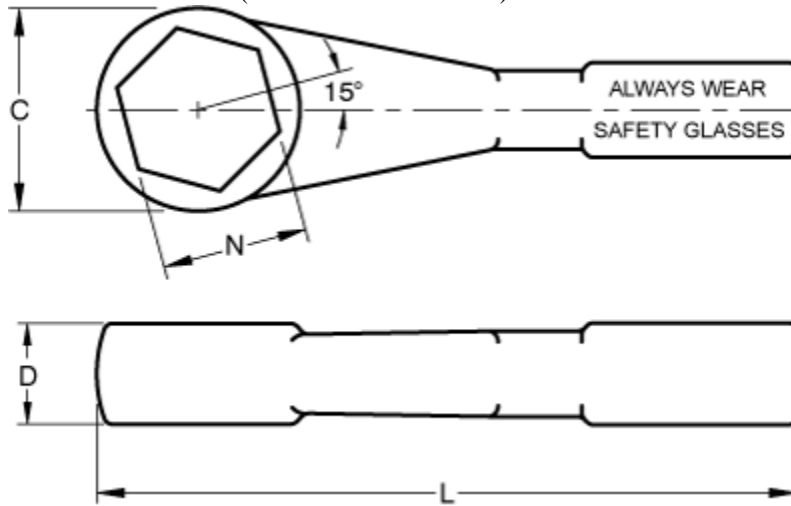
### 4.0 Hammer Wrenches

WOODCO USA offers box end Hammer Wrenches to fit standard ASTM A 194 Grade 2H nuts used with API Spec 6A and API Spec 17D Flange stud bolts, and API Spec 16A Clamp bolts. These wrenches have specific design features for oil field application:

- 15° offset and short handle length allows use in tight spaces
- Straight handle transfers maximum torque when struck
- 6 point fit through 2-1/2" bolt size provides superior stability

**Figure 15 Hammer Wrench Dimensions**

(Reference Table Below)



**Table 10, Hammer Wrench Sizes and Dimensions** (All Dimensions Shown in Inches)

PART NUMBER	H STUD BOLT SIZE	N NUT SIZE ACROSS FLATS (wrench size)	C BOX O.D.	D BOX THICKNESS	L OVERALL LENGTH	WT WEIGHT EACH LBS.
7063	5/8	1-1/16	1-25/32	5/8	9-7/8	1.9
7075	3/4	1-1/4	2	23/32	10-1/4	2.1
7088	7/8	1-7/16	2-17/64	7/8	10-9/16	2.6
7100	1	1-5/8	2-31/64	61/64	11	2.9
7113	1-1/8	1-13/16	2-21/32	63/64	11-5/8	3.5
7125	1-1/4	2	3-1/32	1-7/32	11-11/16	4.0
7138	1-3/8	2-3/16	3-9/32	1-1/4	12	5.2
7150	1-1/2	2-3/8	3-13/32	1-7/16	12-3/8	6.0
7163	1-5/8	2-9/16	3-3/4	1-17/32	12-11/16	6.6
7175	1-3/4	2-3/4	4-11/64	1-17/32	13-1/16	7.5
7188	1-7/8	2-15/16	4-23/64	1-17/32	13-7/16	7.9
7200	2	3-1/8	4-31/64	1-5/8	13-13/16	9.4
7225	2-1/4	3-1/2	4-31/32	1-23/32	14-1/8	10.5
7250	2-1/2	3-7/8	5-35/64	1-23/32	14-1/2	13.3

Inquire with a WOODCO USA technical representative about wrenches for bolt sizes larger than 2-1/2" (3-7/8" hex nut).

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